

# PATENT SPECIFICATION

1,138,514

NO DRAWINGS.

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## COMPLETE SPECIFICATION.

### Methods of Making Photographic Materials.

We, EASTMAN KODAK COMPANY, a Company organized under the Laws of the State of New Jersey, United States of America, of 343 State Street, Rochester, New York 14650, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to the use of amphoteric surface active agents in making photographic materials containing dye developers.

In the preparation of materials for certain diffusion transfer processes, dye developers are incorporated in gelatin solutions, and the resulting dispersions are coated. In general, dye-developers are insoluble in water, and one method of dispersing such a compound in a gelatin solution comprises first dissolving the compound in an organic solvent and then mixing the resulting solution with the solution of gelatin. To facilitate the coating of a dye developer dispersion, it is desirable to use a surface active agent. However various of such agents known for use as coating aids tend to cause separation of the dye developer portion from the aqueous gelatin portion of a dye developer dispersion.

According to the present invention there is provided a method of making a photographic light-sensitive or non-light sensitive material containing a dye developer which comprises coating a support with a layer of a dispersion of the dye developer in an aqueous solution of a proteinaceous material in the presence of a surface active agent of the general formula:



wherein R is an alkyl group containing from

8 to 20 carbon atoms or a group of formula  $\text{R}^1\text{CO}$  wherein  $\text{R}^1$  is an alkyl, alkenyl, alkaryl, alkoxyaryl or aryloxyalkyl group containing from 11 to 17 carbon atoms, M is a water-soluble cation, each of m and n is 1 or 2 and p is (2-m).

Preferred compounds of formula (1) are those in which R is an alkyl group containing from 12 to 18 carbon atoms or a group of formula  $\text{R}^1\text{CO}$  wherein  $\text{R}^1$  is an alkyl group containing from 11 to 17 carbon atoms and M is a hydrogen, alkali metal, ammonium or organic amine cation.

Surface active agents of the general formula (1) wherein R is an aliphatic hydrocarbon chain of 8—20 carbon atoms, M is hydrogen, an alkali metal, ammonium or an amine-cation and n is 2 have been described and claimed for use as coating aids in Specification No. 987,631.

The method of coating proteinaceous layer comprising coating an aqueous solution of the protein containing as a coating aid at least one compound of the general formula (1) wherein R is a group of the formula  $\text{R}^1\text{CO}$  wherein  $\text{R}^1$  is an alkyl, alkenyl, alkaryl, alkoxyaryl or aryloxy radical containing from 11 to 18 carbon atoms is described and claimed in Specification No. 1,115,554.

In carrying out the method of the invention, the surface active agent of formula 1 may be present through being incorporated in the dye developer dispersion. However, it is preferred to incorporate the surface active agent in a second aqueous coating composition which is coated on the support to form a layer contiguous to a layer of the dye developer dispersion. When this preferred procedure is adopted, it is further preferred for the dye developer dispersion to be coated directly on the support and for the second coating composition to be simultane-

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ously applied to a support by a process as described in Specification No. 834,525 using a multiple coating device such as one of those described in Specifications 834,526; 834,527 and 834,528.

The surface active agents of formula (1) enables layers containing dye developers to be formed at good speeds (for instance speeds in the range 50—500 feet per minute) using apparatus such as that described in Specification 716,080 and the Specifications 834,526/7/8 already referred to.

We have found that a concentration in the coating composition no greater than 5% by weight of the surface active agent of formula 1 (based on the weight of the colloid binder) can be used with good results although a higher concentration can be used if desired. The optimum concentration will usually be found to be within the range of 0.5—5% by weight.

Dye developers which may be used in methods of the present invention include those described and listed in Specification No. 1,003,675. The dye developer may be dispersed in the aqueous solution of proteinaceous material after first dissolving it in an organic solvent, or it may be milled, for instance in a ball mill, into the aqueous solution.

The following Examples illustrate the invention:

#### Example 1

A magenta dye developer dispersion was prepared by mixing into an aqueous solution of gelatin containing 25 grams of gelatin per pound of solution, a solution of the magenta dye-developer (2-[p-(2<sup>1</sup>,5<sup>1</sup>-dihydroxyphenethyl) phenylazo]-4-n-propoxy-1-naphthol) in a mixture of cyclohexanone, N-n-butylacetatanilide and ethyl alcohol. The resulting mixture was passed through a colloid mill several times. Four gelatin solutions were prepared containing the surface active agents identified in the table below. The concentrations at which the agents were used are included in the table. Four coatings on cellulose ester film base were then prepared, each by coating simultaneously on the base, using a multiple coating device, a layer of the magenta dye developer dispersion and a layer of one of the gelatin solutions. In each coating, the dye developer layer was next to the base, and so carried the gelatin layer. As indicated in the table, only the coating (No. 4) the one made by the method of the present invention, did not contain coating defects due to repellancy.

Coating No.	Coating Aid	Concentration grams/lb of gelatin solution	Coating Defects (Repellency)
1	"Triton-X 200" (p-tert-octylphenoxyethoxyethyl sodium sulphonate)	0.4 gram	High
2	"Triton-X 200"	0.8 gram	Slightly better
3	p-tert-octylphenoxy-diethoxyethyl sulphate NH <sub>4</sub> salt*	0.4 gram	Slightly better
4	"Deriphat 151" (sodium N-coco**-beta-amino-propionate)	0.4 gram	None

\* See Specification No. 924,320

\*\* coco=alkyl groups corresponding to the fatty acids represented in coconut oil.

"Triton" and "Deriphat" are trade marks.

#### Example 2

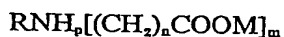
A multilayer coating was prepared containing dye-developer layers as described in Example 1 of Specification No. 1,003,677. The cyan dye-developer layer and the red sensitive emulsion layer were coated simultaneously using a multiple coating hopper by the method described in Specification No. 834,525. The cyan dye-developer layer was coated at a coverage of 218 mg. of gelatin

per square foot and 156 mg. of the cyan dye-developer per square foot. The red sensitive emulsion layer was coated at a coverage of 90 mg. of gelatin per square foot, 243 mg. of silver per square foot and 2 mg. of "Deriphat 151" per square foot. The gelating interlayer, magenta dye-developer layer and the green sensitive silver halide layer also were coated simultaneously by the same method. The gelatin interlayer

had a coverage of 205 mg. of gelatin per square foot. The magenta dye-developer layer was coated at a coverage of 92 mg. of gelatin per square foot and 60 mg. of the magenta dye-developer per square foot. The green sensitive silver halide emulsion was coated at a coverage of 65 mg. of gelatin per square foot, 106 mg. of silver per square foot and 0.97 mg. of "Deriphat 151" per square foot. This coating was found to have fewer coating defects than similar coatings made using "Triton X-200" as the coating aid in place of "Deriphat 151".

#### WHAT WE CLAIM IS:—

1. A method of making a photographic light-sensitive or non-light sensitive material containing a dye developer which comprises coating a support with a layer of a dispersion of the dye developer in an aqueous solution of a proteinaceous material in the presence of a surface active agent of the general formula:



wherein R is an alkyl group containing from 8 to 20 carbon atoms or a group of formula  $\text{R}^1\text{CO}$  wherein  $\text{R}^1$  is an alkyl, alkenyl, alkaryl, alkoxyaryl or aryloxyalkyl group containing from 11 to 17 carbon atoms, M is a water-soluble cation, each of m and n is 1 or 2 and p is (2-m).

2. A method according to Claim 1 wherein the proteinaceous material is gelatin and wherein R is an alkyl group containing 12 to 18 carbon atoms, or is a group of formula  $\text{R}^1\text{CO}$  wherein  $\text{R}^1$  is an alkyl group containing 11 to 17 carbon atoms, and M is a hydrogen, alkali metal, ammonium or organic amine cation.

3. A method according to Claim 1 wherein R is a group  $\text{R}^1\text{CO}$  wherein  $\text{R}^1$  is an alkyl, alkenyl, alkaryl, alkoxyaryl or aryloxyalkyl group containing from 11 to 17 carbon atoms, and  $m=2$ .

4. A method according to Claim 1 wherein the proteinaceous material is gelatin and wherein R is a group  $\text{R}^1\text{CO}$  wherein  $\text{R}^1$  is an alkyl group containing from 11 to 17 carbon atoms and each of m and n is 2.

5. A method according to any of the preceding claims wherein the surface active agent is present during the coating of the dye developer dispersion in a second aqueous coating composition which is coated to form a layer contiguous to the layer of the dispersion.

6. A method according to Claim 5 wherein the dye developer dispersion is coated directly on the support the second aqueous coating composition being simultaneously applied to the support by means of a multiple coating device.

7. A method according to Claim 5 or 6 wherein the second aqueous coating composition contains gelatin.

8. A method according to any of Claims 5 to 7 wherein the second aqueous coating composition is a light-sensitive photographic silver halide emulsion.

9. A method according to Claim 7 or 8 wherein the second aqueous coating composition contains from 0.5 to 5.0% by weight of the surface active agent of the general formula (1) based on the weight of the gelatin.

10. A method according to any of the preceding Claims wherein the dye developer is 2-[p-(2',5'-dihydroxyphenethyl) phenyl-azo]-4-n-propoxy-1-naphthol and the surface active agent is sodium N-coco- $\beta$ -aminopropionate.

11. A method according to Claim 1 as described in either of the Examples herein.

12. A photographic material made by a method according to any of the preceding claims.

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